

STUDIES ON THE GENUS *ANTHONOMUS* IN NORTH AND
CENTRAL AMERICA (COLEOPTERA: CURCULIONIDAE)
II. THE SUBGENUS *ANTHONOMORPHUS* DIETZ^{1, 2}

By HORACE R. BURKE

The subgenus *Anthonomorphus* was erected by Dietz (1891:194) to include *Anthonomus fulvus* LeConte, *Anthonomus peninsularis* Dietz, and *Anthonomus pervilis* Dietz. Dietz considered the size and position of the eyes to be the most distinctive characters of the subgenus, describing these as "small, subrostral in their position and somewhat approximate upon the front." Comparison of the size of the eyes of members of this subgenus with those of other *Anthonomus* indicates that this character is of no taxonomic value in defining the subgenus; however, the position of the eyes is a useful criterion for distinguishing *Anthonomorphus* from most other species-groups of *Anthonomus*. The eyes appear to be located on the base of the rostrum rather than on the head; this illusion is accentuated by the head being somewhat conical and more or less constricted on the sides behind the eyes.

While searching for additional characters to define *Anthonomorphus*, a number of similarities between this subgenus and *Trichobaropsis* Dietz were noted. *Trichobaropsis* was proposed as a subgenus by Dietz (1891:196) to include *Anthonomus texanus* Dietz, and was separated from other subgenera primarily on the basis of the emarginate prosternum and the seventh funicular segment of the antenna being somewhat more closely associated with the club. The first of these characters is shared with several species of *Anthonomus*, including *fulvus* and *peninsularis*, while the second one alone does not appear sufficiently distinct to justify recognizing *Trichobaropsis* as a subgenus. Since good subgeneric characters are lacking and as *texanus* shares many features in common with *fulvus* and *peninsularis*, *Trichobaropsis* is here considered a junior synonym of *Anthonomorphus*.

Males of *Anthonomorphus* can be readily recognized by the mesotrochanters. The male mesotrochanter (figs. 11, 13) is nearly parallel-sided, with the apex broadly angulate or obliquely truncate, and the extreme apical portion is free from the side of the femur. The outer margin of the mesotrochanter of the male does not form a continuous line with the inner margin of the femur as in other *Anthonomus*, including females of *Anthonomorphus*. The mesotrochanter (fig. 12) of the female is elongate-triangular, with the apex acutely pointed and applied closely to the side of the femur.

Some characters of apparent value in delimiting *Anthonomorphus* were also found in the male genitalia. The median lobe (figs. 7-10) is a fairly stout, flattened structure with rather long, slender basal apodemes. The most

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distinctive feature of this component of the genitalia is the broad apex with the usually well defined median projection and poorly to well developed lateral processes. This form of apex of the median lobe has not been observed in any other of the approximately 100 species of *Anthonomus* I have dissected for examination of genitalia. In addition to possessing characters apparently diagnostic for the subgenus, the median lobe is also useful in separating species of *Anthonomorphus*. It should be used with caution for this purpose since considerable intraspecific variation was observed in the material at hand. However, this does not present a problem in recognition of the species since they are easily identifiable by external characters.

An additional sexual dimorphic character is found in the apical armature of the metatibiae. The metatibia of the male is expanded apically into a large mucro (fig. 14) which is roughly triangular, somewhat twisted, and deeply concave on the outer side. The female mucro (fig. 15) is much smaller and more spike-like in appearance. The two sexes may be easily separated by this character, a fact which to my knowledge has not heretofore been mentioned in connection with *Anthonomus*. Some other species of the genus have this type of male mucro, but it is usually not as prominent as in *Anthonomorphus*.

In addition to the weevils originally placed here by Dietz, several Nearctic and Neotropical species have been assigned to *Anthonomorphus* and *Trichobaropsis* by more recent workers (Hustache, 1929; Schenkling and Marshall, 1934; Voss, 1944). I have examined several of these species (*A. eugenii* Cano, *A. fulvipes* Champion, *A. grandis* Boheman, *A. griseisquamis* Champion, and *A. rubiginosus* Champion) in light of the new taxonomic characters presented here and they are clearly not assignable to *Anthonomorphus*. It is obvious from descriptions alone that other species have been incorrectly assigned to the subgenus. *Anthonomus grandis* is the only one of the above-mentioned species which presents much of a problem as to its relationship to members of the subgenus. I have been unable to find characters which would exclude females of *grandis* from *Anthonomorphus*, but it is quite evident from males that this species belongs elsewhere. Although males of *grandis* resemble species of *Anthonomorphus* by having the eyes evenly convex and somewhat subrostral, and the head feebly constricted on the sides behind the eyes, they differ distinctly in the mesotrochanters and genitalia.

This study is based on material in the following collections: Boll Weevil Research Laboratory of the U.S. Dept. of Agriculture, British Museum (Natural History), Canadian National Collection, California Academy of Sciences, California Department of Agriculture, Carnegie Museum, Cornell University, Illinois Natural History Survey, Museum of Comparative Zoology, Michigan State University, Ohio State University, Oklahoma State University, Texas A & M University, University of California at Berkeley, University of Kansas, U.S. National Museum, and the private collections of D. G. Kissinger and C. W. O'Brien. I am deeply indebted to persons in charge of the above collections for their generous loan of material for study. I would especially like to thank Hugh B. Leech of the California Academy of Sciences for the loan of a large series of *peninsularis* and for

making available to me most of the specimens on which the description of *cognatus* is based. The assistance of V. S. House of College Station, Texas, in making the photographs included in this paper is also gratefully acknowledged.

Measurements reported herein were made as described in the first paper of this series.

Subgenus *Anthonomorphus* Dietz

Anthonomorphus Dietz, 1891, p. 194 (type, *A. fulvus* LeConte, by original designation); Voss, 1944, p. 45; Gilbert, 1953, p. 41.

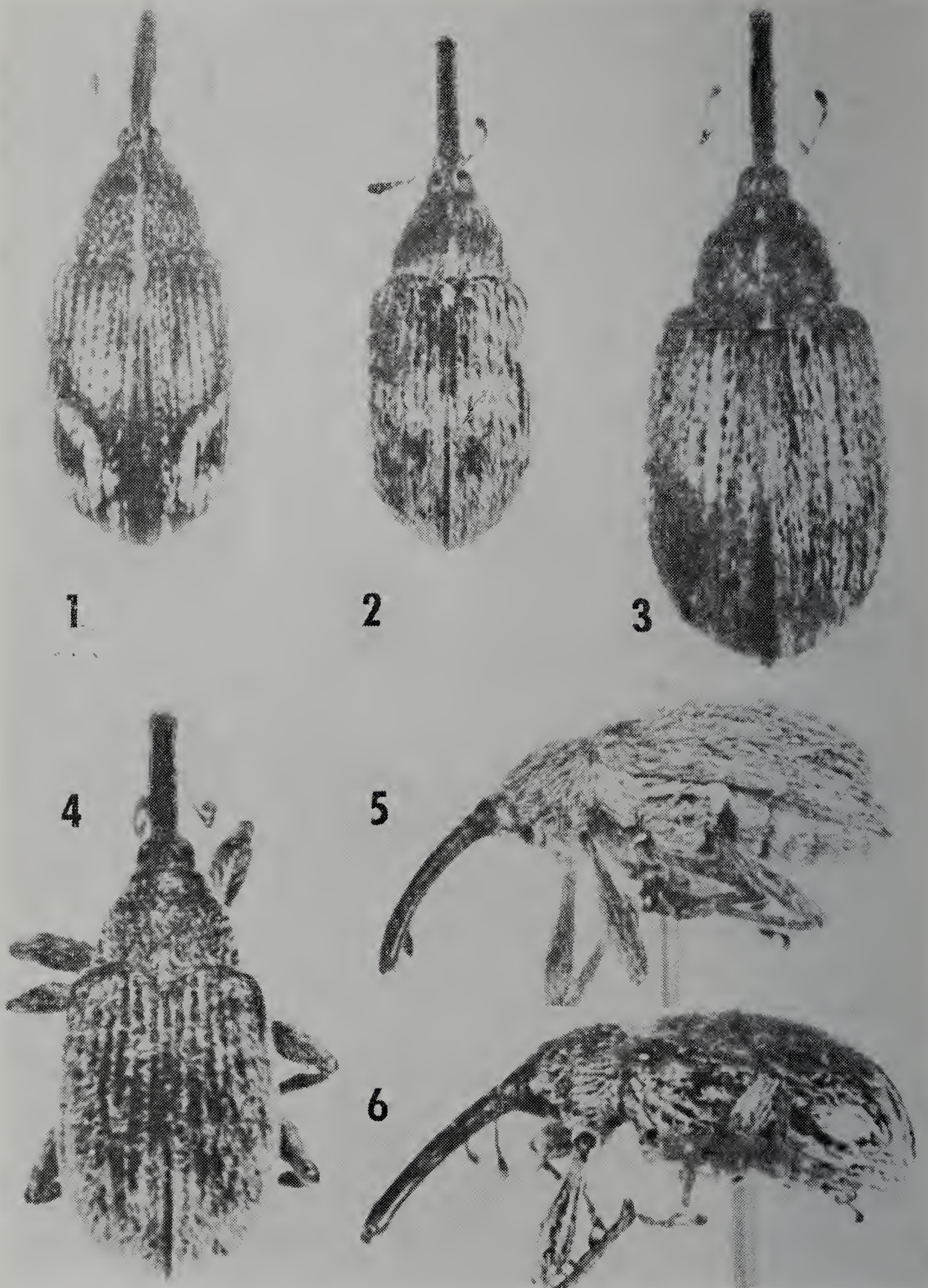
Trichobaropsis Dietz, 1891, p. 196 (type, *A. texanus* Dietz, by original designation and monotypy). (NEW SYNONYMY)

Body elongate-oval; pubescent. Rostrum slender, slightly to distinctly curved; dorsally with three prominent carinae extending from base to point opposite antennal attachments; lateral rostral groove directed toward lower front margin of eye. Antennal funicle 7-segmented; club elongate-oval. Eyes evenly, moderately convex, not free behind; located at base of rostrum. Head conical, sides feebly to distinctly constricted behind eyes; front foveate. Prothorax with sides feebly rounded and strongly narrowed from base to apex; prosternum emarginate before coxae. Elytra slightly to distinctly wider at base than prothorax; humeri feebly to strongly rounded. Femora bidentate, outer tooth smaller and may be absent on hind femora. Mesotrochanter of male prominent, apex broadly angulate to obliquely truncate, extreme apical portion free from side of femur; female mesotrochanter elongate-triangular, closely applied to side of femur throughout entire length, apex acutely pointed. Tibiae along inner margins distinctly sinuate and finely carinate; metatibiae of male with large, triangular apical mucro, that of female small, inconspicuous, spike-like. Tarsal claws each bearing a long, slender tooth on inner side. Median lobe of male genitalia feebly curved in lateral view, flattened dorsoventrally; median dorsal and ventral pre-phallosomic areas entirely membranous; endophallus (internal sac) bearing numerous small spines; apex broad, with a short median projection and with poorly to well developed lateral processes.

KEY TO SPECIES OF THE SUBGENUS ANTHONOMORPHUS

(Measurements made from 30 specimens of each species)

1. Coarse, white pubescence forming patterns on elytra, elsewhere vestiture finer, less dense (fig. 1); meso- and metasternum, and sometimes also abdominal sternites, piceous or black, distinctly darker than rest of body; length of body, 3.70-5.37, average 4.62 mm.; width, 1.81-2.59, average 2.18 mm.-----FULVUS
Elytral pubescence moderately dense, evenly distributed, never forming patterns; meso- and metasternum not noticeably differing in color from rest of body----- 2
2. Prothorax at base distinctly narrower than elytra; length of prothorax along dorsal midline equal to, or but slightly greater than, width of an elytron immediately behind humerus; humeri prominent (fig. 3); length of body, 4.18-5.70, average 4.92; width, 2.00-2.74, average 2.44 mm.-----PENINSULARIS
Prothorax at base only slightly narrower than elytra (figs. 2, 4); length of prothorax along dorsal midline distinctly greater than width of an elytron behind humerus -- 3
3. Elytral humeri slightly rounded (fig. 4); most setae on antennal funicle tapering to fine points; antennal club not longer than preceding four funicular segments combined; body robust; length of body, 4.33-5.55, average 4.88 mm.; width, 1.96-2.59, average 2.21 mm.-----COGNATUS
Elytral humeri less strongly rounded (fig. 2); most setae on antennal funicle parallel-sided with blunt apices; antennal club slightly to distinctly longer than preceding four funicular segments combined, sometimes as long as preceding five; body narrower, usually smaller; length of body, 3.22-4.80, average 4.11 mm.; width, 1.59-2.22, average 1.89.-----TEXANUS



FIGURES 1-6, *Anthonomus* spp. 1—*A. fulvus*, male, dorsal view. 2—*A. texanus*, male, dorsal view. 3—*A. peninsularis*, male, dorsal view. 4—*A. cognatus*, holotype male, dorsal view. 5—*A. peninsularis*, female, lateral view. 6—*A. cognatus*, female, lateral view.

Anthonomus fulvus LeConte

(FIGS. 1, 7, 13-16)

Anthonomus fulvus LeConte, 1858, p. 79; LeConte and Horn, 1876, p. 197; Dietz, 1891, p. 195.

Anthonomus fulvus is easily recognized by its reddish brown body with the darker meso- and metathorax, and the distinctive pattern of white scale-like pubescence on the elytra. The prothorax is usually more closely and coarsely punctate than in other members of the subgenus. The male median lobe is more strongly narrowed apically than in other *Anthonomorphus* and the apex usually has only poorly defined median and lateral processes.

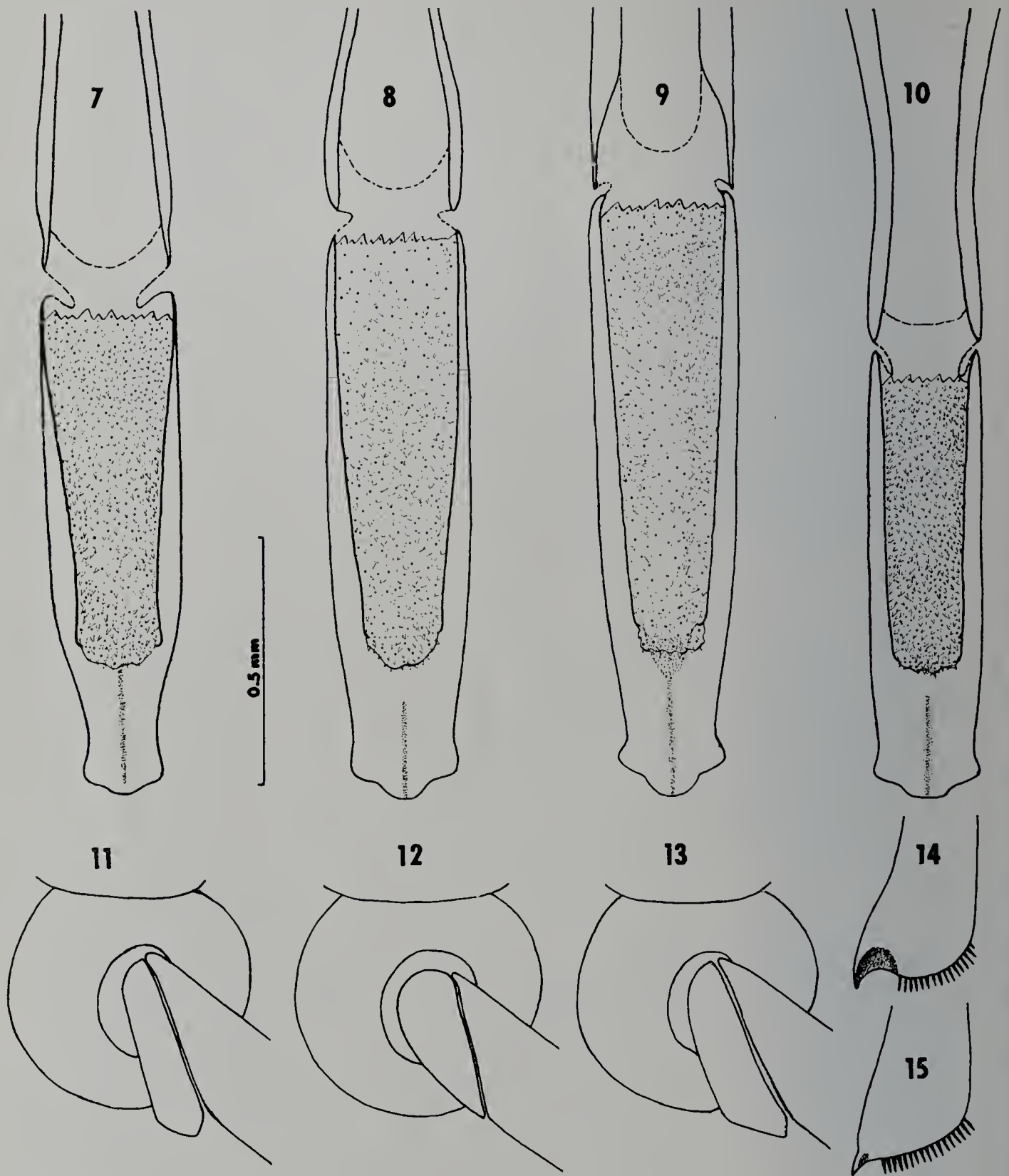
This species was described by LeConte from specimens sent him by Lt. Horace Haldeman from Ringgold Barracks at Rio Grande City in Starr County, Texas. I have seen no specimens of *fulvus* which were definitely known to have been collected in the Lower Rio Grande Valley of Texas, but the occurrence of the species there would not be surprising since it is quite common about 150 miles north of the area. Haldeman collected in several localities in southern and southwestern Texas, all of which are within the known range of *fulvus*. In view of the lack of specimens of this large and distinctive species from the rather extensively collected Lower Rio Grande Valley, the possibility exists that the examples sent to LeConte from Ringgold Barracks were actually collected elsewhere in the State.

There is a male and female specimen of *fulvus* bearing type labels and a third specimen labeled only "Tex" in the LeConte Collection. In addition to these, I have examined 171 specimens from the following localities: KANSAS—CLARK CO.: (no other locality data). EDWARDS CO.: Nettleton. GOVE CO. (no other locality data). PAWNEE CO.: Larned. SCOTT CO.: Scott State Park. SEDGWICK CO.: Mount Hope. ST. JOHN CO. (no other locality data). SUMNER CO.: Wellington. THOMAS CO. (no other locality data). WALLACE CO.: Wallace. OKLAHOMA—CARTER CO.: Ardmore. CHOCTAW CO.: Hugo. GRADY CO.: Chickasha. TEXAS—BEXAR CO.: San Antonio. BRAZOS CO.: College Station. BREWSTER CO.: Marathon. DALLAS CO.: Dallas. LAVACA CO.: Hallettsville. LEE CO.: Fedor. MARION CO.: Jefferson. REFUGIO CO.: Austwell. SAN PATRICIO CO.: 2 mi. S. Gregory. VICTORIA CO.: Victoria.

I have also seen a specimen of *fulvus* labeled "Olympia, Wash" in the California Academy of Sciences and another one labeled "Ohio" in the Museum of Comparative Zoology. Since these localities are considerably outside the range of *fulvus* as now understood, and as I am unable to find additional evidence of the occurrence of the species in the two states, these records are here considered questionable.

Anthonomus fulvus has frequently been collected on *Callirrhoe involucreta* in Texas. According to Pierce (1907: 268) "The adults feed on the floral column [of *Callirrhoe involucreta*]. The egg is laid in the flower bud and the larva develops at the expense of the floral column, finally eating its way into the capsule and pupating, or if the flower has been sealed

properly and prevented from opening, pupation may take place in the fallen corolla." Several specimens in the U.S. National Museum from San Antonio, Texas, bear label data indicating they were reared from *Callirrhoe digitata*.



FIGURES 7-15, *Anthonomus* spp. (7-10 drawn to same scale; 11-15 greatly enlarged.)

FIGURES 7-10, Male median lobe, dorsal view. 7—*A. fulvus*. 8—*A. peninsularis*. 9—*A. cognatus*. 10—*A. texanus*.

Figures 11-13, Lateral view of left mesocoxa, trochanter, and base of femur. 11—*A. texanus*, male. 12—*A. texanus*, female. 13—*A. fulvus*, male.

FIGURES 14-15, *A. fulvus*, outer aspect of metatibia. 14—Male. 15—Female.

Adults of this weevil have been collected from early April until the middle of July, with most of the available collection records being in April. Mitchell and Pierce (1911:54) found larvae in buds of *C. involucrata* as early as March 4 in Victoria County, Texas.

The pupa of *fulvus* was illustrated by Pierce (1907:299); the larva has not yet been described.

Anthonomus peninsularis Dietz

(FIGS. 3, 5, 8, 16)

Anthonomus peninsularis Dietz, 1891, p. 195; Gilbert, 1953, p. 41.

Anthonomus pervilis Dietz, 1891, p. 196.

This species may be readily separated from other *Anthonomorphus* by having the prothorax smaller in comparison to the size of the elytra (fig. 3), and by the more nearly erect pubescence of the body. *Peninsularis* is most likely to be confused with *cognatus*; in fact, representatives of the two species were mixed in some collections I examined. These two species are quite different and may be readily separated by characters given in the accompanying key. Additional differences are presented under the discussion of the relationships of *cognatus*.

Gilbert (1953:41) synonymized *pervilis* with *peninsularis*, attributing the differences described by Dietz to sexual dimorphism involving the degree of convexity of the eyes and the color of the body. After examining the types of *peninsularis* and *pervilis* (both in the Ulke Collection at the Carnegie Museum), I agree that this synonymy is warranted. However, the differences between these two specimens are due to normal intraspecific variation rather than sexual dimorphism. The types of both *peninsularis* and *pervilis* are males; Dietz considered the *pervilis* type to be a female and was apparently followed in this erroneous assumption by Gilbert. Sexual dimorphism in *peninsularis* is most noticeably exhibited in the mesotrochanters and apical armature of the metatibae. Members of this species do vary considerably in color, the body being usually black or ferrugineous with occasional intergrades, but this variation in color occurs about equally in both sexes. Gilbert (*loc. cit.*) states that the eyes of males of *peninsularis* are larger and more strongly convex than those of females. I have been unable to find any consistent differences in the size and degree of convexity of the eyes of the two sexes. The eyes of females of this species are often as prominent, and sometimes more prominent than those of males.

In addition to the type of *peninsularis*, I have examined 170 specimens from the following localities: ARIZONA—PIMA CO.: Molino Basin, Mt. Lemmon; Sabino Canon, Catalina Mts. YAVAPAI CO.: Jerome. CALIFORNIA—INYO CO.: Argus Mts.; 4 mi. E. Bigpine; Bishop; Cave Springs; Inyo Mts.; Keeler to Darwin Road; Lone Pine; Olancho; Owens Lake; Owens Valley; Panamint Mts.; Surprise Canyon, Panamint Mts.; Westgard Pass Plateau. RIVERSIDE CO.: Palm Springs; Pinon Flat, San Jacinto Mts. SAN DIEGO CO. (no other locality data). NEVADA—ESMERALDA CO.: Goldfield. LYON CO.: Yerington.

Dietz states that the type of *peninsularis* came from "Lower California; exact locality not given." This specimen in the Ulke Collection is labelled only "Cal."

According to label data, *peninsularis* has been collected on *Sphaeralcea ambigua*, *Malacothamnus orbiculatus*, and *Encelia farinosa* in California, and *Riddellia cooperi* in Arizona. *Sphaeralcea ambigua* is the most frequently listed plant on labels of material I have examined, but additional evidence is needed to determine whether or not it is a true host of *peninsularis*. This weevil has been collected in April, May, and June.



FIGURE 16—Geographic distribution of species of the subgenus *Anthonomorphus*.

Anthonomus texanus Dietz

(FIGS. 2, 10-12, 16)

Anthonomus texanus Dietz, 1891, p. 197; Champion, 1903, p. 187; Pierce, 1908, p. 174.

Anthonomus texanus most closely resembles *cognatus* from which it is easily separated by the key characters. Specimens of *texanus* vary considerably in size, but are usually smaller and the body is narrower than that of other members of the subgenus. The median lobe of the male genitalia is stouter and the sides are only slightly narrowed toward the apex.

The male type from Texas in the Dietz collection in the Museum of Comparative Zoology has been examined. In addition, I have seen 70 specimens from the following localities: UNITED STATES—ARIZONA (State label only). NEW MEXICO—DONA ANA CO.: Las Cruces. TEXAS—BREWSTER CO.: Chisos Mts.; Marathon; "Rio Grande." EL PASO CO.: El Paso. HUDSPETH CO.: Indian Hot Springs. PECOS CO.: 3.6 mi. N. Bakersfield. PRESIDIO CO.: Presidio; Ruidosa. VAL VERDE CO.: Devil's River. MEXICO—AGUASCALIENTES—Pabellon. CHIHUAHUA—Guadalupe; 6 mi. WSW Jimenez; Ojinaga. GUANAJUATO—Tupataro; 9 mi. S. San Luis de la Paz. HIDALGO—Langunillo. MEXICO—Santa Clara; Teotichuacan.

Pierce (1908:174) reported rearing a specimen of *texanus* from a bud of *Sphaeralcea angustifolia* in Texas. Label data of specimens examined indicate *texanus* has been collected on *Sphaeralcea angustifolia*, *S. ambigua* and *S. emori-variabilis* in Texas, and on *S. fenderli* in New Mexico. This weevil has been collected on plants from April through September and in ground trash around cotton fields in January and February.

Anthonomus cognatus Burke, NEW SPECIES

(FIGS. 4, 6, 9, 16)

Holotype male: Body-length, 4.85 mm. Rostrum-length, 2.04 mm. Prothorax-length, 1.26 mm.; width, 1.63 mm. Elytra-length, 3.70 mm.; width, 2.37 mm.

Oblong-oval; body black, rostrum and legs reddish brown, scape, basal segments of funicle and tarsi slightly paler in color; pubescence coarse, gray, uniformly distributed, semierect on dorsal surface, recumbent on abdomen and underside of thorax.

Rostrum slightly, evenly curved, feebly wider near apex; distinctly tricarinate from base to point opposite antennal attachments, carinae minutely punctate; apical portion shining, bearing small, oval, scattered punctures. *Antennae* attached slightly before middle of rostrum; scape slender, feebly curved, rather suddenly enlarged on apical fifth; first funicular segment slender and as long as 2 + 3, segment 2 as long as 3 + 4, remaining segments about equal in length, segment 7 distinctly broader, each segment bearing a whorl of inclining white setae which taper to fine points, setae becoming progressively longer toward club; club as long as preceding four funicular segments combined. *Eyes* strongly convex, nearly round, separated on front by distance equal to length of first funicular segment of antenna. *Head* with sides converging to a rather distinct constriction behind eyes; front rugosely punctate, striate between eyes; vertex finely punctate, bearing a few scattered coarse hairs; fovea deep, round. *Prothorax* with sides subparallel in basal two-thirds thence converging into a fairly distinct subapical constriction; disc rather densely covered with small, deep punctures, each of which has a slender scale-like hair arising from its

posterior margin, raised areas between punctures smooth. *Scutellum* with sides subparallel, posterior margin broadly rounded. *Elytra* wider than prothorax at base; humeri moderately rounded; sides diverging slightly from behind humeri to about middle, thence rather evenly rounded to apices; intervals nearly flat on disc of elytra except at base where they are slightly more convex; striae deeply impressed throughout. *Abdomen* with first sternite depressed in middle; suture between sternites 1 and 2 indistinct, especially in middle. *Legs* slender; femora rather strongly clavate; tarsi slender.

Female allotype (body-length, 5.33 mm.; width, 2.44 mm.) differs from holotype in having a slightly straighter rostrum, antennae attached just behind middle of rostrum, and first abdominal sternite flattened in middle. *Elytra* and prothorax of allotype dark reddish brown whereas those of holotype are black, but this is an individual rather than sexual difference. Vestiture on head and rostrum (these areas rubbed in holotype) consists of semierect pubescence on and immediately above interocular area, and finer pubescence in striae on basal half of rostrum.

Paratypes agree well with holotype and allotype except for some slight size (for size range see measurements in key) and color differences. Vestiture of a few paratypes is more noticeably dense than in others due to their being in a better state of preservation. Vestiture of members of this species is very easily abraded by rubbing.

Anthonomus cognatus most closely resembles *texanus*; the several differences between these two species are given in the key and under the discussion of *texanus*. Since *cognatus* might also be confused with *peninsularis*, it should be noted that in addition to the characters used in the key, females of the two may be separated by the almost straight rostrum of *cognatus* as compared with the distinctly curved one of *peninsularis* (cf. figs. 5 and 6). The antennal club of *cognatus* is never longer than the preceding four funicular segments combined while that of *peninsularis* is always longer than these segments.

The only reference to a plant on the label data of members of the type series of *cognatus* is that accompanying five specimens from 22 miles west of Patterson, Calif., each of which is labeled "on Salix." Since it is either definitely known or strongly indicated that malvaceous plants are hosts of other members of the subgenus, the willow referred to on these labels was possibly serving only as a resting site.

Holotype male, Potwisha, Sequoia Natl. Park, California, V-9-1931, Van Dyke Collection, alt. 3000-5000 ft.; *Allotype female*, same data except collected V-19-1920 and alt. 2000-5000 ft.; and 60 *paratypes* as follows: 6 ♂♂, 8 ♀♀, same data on holotype; 2 ♀♀, same data as allotype; 12 ♂♂, 12 ♀♀, Potwisha, Sequoia Natl. Park, Calif., V-20-30, alt. 2000-5000, Van Dyke Collection; 1 ♂, Potwisha, Sequoia Natl. Park, V-19-30, 2000-3000 ft., A. T. McClay; 4 ♂♂, 3 ♀♀, Sequoia Natl. Park, Calif., V-9-31, A. T. McClay; 2 ♂♂, 2 ♀♀, Sequoia Natl. Park, Calif., VI-9-1931, A. T. McClay; 2 ♂♂, Lebec, Calif., alt. 4000 ft., V-15-1928, J. O. Martin; 1 ♀, 8 mi. N. Lake of the Woods, Kern Co., Calif. VII-15-61, 5200 ft., C. W. O'Brien; 4 ♂♂, 1 ♀, Adobe Creek 22 mi. W. Patterson, Calif., Stanislaus Co., IV-23-49, Hugh B. Leech, on Salix.

The holotype and allotype of *cognatus* are deposited in the California Academy of Sciences; paratypes are deposited there and in the collections of California Department of Agriculture, University of Kansas, Texas A & M University, and C. W. O'Brien.

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APION LONGIROSTRE OLIVIER, WIDELY DISTRIBUTED IN
NORTH AMERICA (COLEOPTERA: CURCULIONIDAE)

Apion longirostre Olivier commonly known as the 'hollyhock weevil' is a species introduced from Europe and is recently coming to attention in the United States. It breeds in the seeds of hollyhock and is becoming widely distributed here. It has now been found in the following States: New York, Pennsylvania, Ohio, Maryland, Virginia, Illinois, Missouri, Arkansas, Kentucky, Tennessee, North Carolina and Wisconsin; and in Canada, in Ontario (Simcoe, Norfolk Co., and Chatham). Observations have indicated that *A. longirostre* feeds only on hollyhock, but according to Shchegolev, V. N., Znamenskii, A. V., and Bey-Bienko, G. J. (1937, *Insect Pests of Field Crops*, Moscow, 2nd ed.: 486-487) it is a pest of field crops in U.S.S.R. The name appears in a list of cotton pests by Iyriboz (1941, *T. C. Ziraat Vekâleti Nesriyati Umum No. 237* [Turkey], *Mahsul Hastalıkları No. 1:80*). For information on the life history and habits of *A. longirostre* see Tuttle (1954, *Ann. Ent. Soc. America* 47(2):306) and Tattershall and Davidson (1954, *Jour. Econ. Ent.* 47(1): 182, figs. 1, 2).—ROSE ELLA WARNER, *Ent. Res. Div., A.R.S., U. S. Department of Agriculture, Washington, D. C.*